DOCUMENT RESUME

ED 469 105 SE 066 851

TITLE	Sample Curriculum Model, Grade 8, Based on the 1998 Arkansas State Mathematics Framework.
INSTITUTION	Arkansas State Dept. of Education, Little Rock.
PUB DATE	1998-00-00
NOTE	29p.; For Sample Curriculum Models, Grades K-7, see SE 066 843-850.
AVAILABLE FROM	For full text: http://arkedu.state.ar.us/curriculum/benchmarks.html.
PUB TYPE	Guides - Non-Classroom (055) -- Legal/Legislative/Regulatory Materials (090)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	*Academic Standards; Algebra; Geometry; *Grade 8; Junior High Schools; Mathematics Curriculum; *Mathematics Instruction; Measurement; Number Concepts; Numeracy; Patterns in Mathematics; Probability; State Curriculum Guides; Statistics
IDENTIFIERS	*Arkansas

ABSTRACT

This document consists of a sample curriculum model for grade 8 mathematics based on the 1998 Arkansas State Mathematics Framework. The document is divided into five sections: (1) Number Sense, Properties, and Operations; (2) Geometry and Spatial Sense; (3) Measurement; (4) Data Analysis, Statistics, and Probability; and (5) Patterns, Algebra, and Function. Within each section the standards are exemplified and articulated by benchmarks, suggested assessments, and possible strategies and activities for teaching the standard. (MM)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 469 105

SAMPLE CURRICULUM MODEL

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

J. Boardman

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Grade 8

based on the 1998 Arkansas State Mathematics Framework
Arkansas Department of Education, 1998

SE 060 851

BEST COPY AVAILABLE

Grade Level_8_
NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.1 Identify numerical patterns (e.g., prime numbers, squares, exponents) and verify results (e.g., by continuing the pattern).	Students will identify and extend arithmetic (when the difference between the terms is constant) (e.g., 3, 6, 9, 12, ...) and geometric (when the ratio between the terms is constant) (e.g., 1, 3, 9, 27, 81, ...) sequences; represent an arithmetic and geometric sequence algebraically.	. Teacher made test . State-wide tests . Perform-ance . Writing	. Each student creates two sequences (arithmetic and geometric) that has a specified numeral as a third term in the sequence. Students record their sequences in a table format.
SLE NPO.1.2 Expand number sense through the use of mental computation, calculators/ technology, and written and verbal communication (e.g., powers of ten, factoring, greatest common factors, least common multiples).	Students will expand number sense by: mentally solving simple linear equations (e.g., If $2x + 1 = 7$, then $x = 3$.); mentally computing the cube of the whole numbers 1 through 5; using truncating as a form of estimation (e.g., $132 + 45 = 130 + 40 = 170$); solving word problems using calculators/technology as learning tools and organizational tools (e.g., using calculators to make scatter plots and to calculate lines and curves to fit data); oral and/or written communication of reasoning for result of computations; use a scoring guide to perform self-evaluation.	. Teacher made test . State-wide test . Perform-ance . Writing	. Students investigate and decide whether they would prefer to pay prices that are rounded or truncated on sales items. (An extension may be to have the students determine the amount of extra money saved or spent.) The decision and rationale are recorded in their math journals.

Grade Level_8_
NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.3 Represent numbers and operations in a variety of equivalent forms (including models, tree diagrams, and symbols).	Students will: convert repeating decimals to equivalent fractions (0.33 with a bar over the last 3 = 1/3); represent multiplication using adjacent terms (e.g., 3n or xy).	. Teacher made test . State-wide tests . Perform-ance . Writing	. See NPO.1.1, NPO.1.6, and NPO.2.4
SLE NPO.1.4 Consistently demonstrate competence with rational number computations (add, subtract, multiply, and divide) with and without manipulatives and technology.	Students will: use manipulatives, pictures, symbols and technology to add, subtract, multiply, and divide decimals, integers, fractions, and mixed numbers with and without variables to investigate real-world situations; identify and use rational number properties.	. Teacher made test . State-wide test . Demon-stration . Perform-ance	. Students are given a number line with the coordinates 0, 1, and 2 identified and points A through F plotted at the following approximate locations: A at -1/4; B at 3/8; C at $\frac{1}{2}$; D at 5/8; E at 3/4; F at 1 5/8 (only the point is identified not the corresponding coordinate). Students are asked questions such as "If the fractions represented by the points D and E are multiplied, what point on the number line best represents the product?" and others that come to mind. Students justify their answers by explaining their reasoning in writing. Students identify the properties used in their reasoning. (Refer to NCTM Addenda Series Grades 5-8 Developing Number Sense 1992, p 34.)

Grade Level 8

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.5 Communicate knowledge of elementary number theory concepts (e.g., primes, factors, multiples, divisibility rules) through classroom interaction and written responses (e.g., tests, journals).	Students will communicate knowledge of: absolute value of an integer; square roots of perfect squares up to 144; simple linear equations; repeating decimals; operations with decimals, integers, fractions and mixed numbers through classroom interaction (e.g., performance assessments, response to verbal questions, etc.) and written responses (e.g., response to open-ended questions, journals, etc.); use a scoring guide to perform self-evaluations.	. Teacher made test . State-wide tests . Writing . Exhibit-ion	. Students communicate the relationship of distance and the absolute value of an integer using number lines by marking off the relative distance (space) between pairs of numbers.
SLE NPO.1.6 Identify, with/without the aid of technology, irrational numbers and locate irrational numbers relative to other numbers (e.g., the square root of 2 is between 1 and 2, pi is between 3 and 4).	Students will identify, with/without technology, irrational numbers and locate irrational numbers relative to other numbers (e.g., the square root of 2 is between 1 and 2).	. State-wide test . Demon-stration . Observ-ation	. Extend the application of the Pythagorean theorem addressed in GS.1.2 to have students model on a geoboard a right triangle with legs the length of one unit. The students estimate and then calculate the length of the hypotenuse of the formed right triangle and locate the value relative to the value of the leg length.

Grade Level_8_

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.2.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.2.1 Use estimation to check the reasonableness of computation in application problems.	Students will use estimation techniques (i.e., rounding, truncating, etc.) to check the reasonablenes of the square root of a whole number, the cube of a whole number, and the answers to comsumer-type problems (e.g., sales tax, discounts, simple interest, etc.).	. Teacher made test . State-wide test . Perform-ance . Writing	. See NPO.1.2
SLE NPO.2.2 Develop strategies for comparing quantities using ratios and proportions (e.g., fractions, rates, unit rates, percents, scales) with use of manipulatives and technology.	Students will determine unit rates, determine if a pair of ratios form a proportion and solve proportions, solve problems using proportions use ratios to solve scale-drawing problems (e.g., maps, blueprints, etc.), apply proportions to percents (e.g., 7/8 = x/100).	. Teacher observation . State-wide test . Teacher-made test . Demon-stration	. Extend GS.2.2 to have the students use proportions to make a scale drawing for the proposed ramp.

Grade Level 8

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.2.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.2.3 Determine the most appropriate notational representation of a number for the given problem (e.g., fractions vs. decimals, scientific notation).	Students will determine the most appropriate notational representation of a number for the given problem (e.g., fractions, mixed numbers, decimals, scientific notation, exponents, algebraic, etc.)	. Teacher made test . State-wide test . Writing . Perform-ance	. Students will determine the most appropriate representation of a number during data organization and analysis. . See NPO.2.4, M.1.2, M.2.1
SLE NPO.2.4 Explain the relationship of numbers in one- and two-dimensional graphs (e.g., number lines and coordinate graphs), with and without appropriate technology such as graphing calculators.	Students will explain the relationship of numbers on graphs of linear equations with and without appropriate technology such as graphing calculators.	. Teacher made test . State-wide test . Demon-stration . Writing	. Students time one another using a stop watch while walking various increments of length (such as, 2 meters, 4 meters, 6 meters, etc.). The distance walked and the length of time are entered into a table in the graphing calculator. The scatter plot of the information is made and the students predict the equation for the line of best fit. Their predicted equation is entered into the calculator and graphed. A linear regression is performed using the calculator. This gives the calculator's equation of the line of best fit. The calculator's equation is then graphed on the calculator. The students make a comparison of the equations and report their findings.

Grade Level 8

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.2.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.2.5 Communicate using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., integers, whole, rational, irrational, natural/counting, etc.).	**Students will communicate in written or verbal form using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., whole, natural/counting, rational, integers, irrational, etc.); use a scoring guide to perform self-evaluations.**	. Teacher made test . State-wide tests . Writing . Project	. See NPO.1.2 . Extend GS.2.2 to have students explain their process for designing the wheel chair ramp.

Grade Level 8

GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.1 Identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (from points to *polyhedra*) with physical materials.	Students will identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (e.g.,solids with nets/paper patterns, cross sections of solids, etc.) with physical materials.	. Teacher made test . State-wide test . Perform-ance . Writing	. Students are given grid paper, examples of solids, scissors, tape, and markers. Students draw on the grid paper the polygons that make up the faces of the solid. Students then cut the polygons out of the grid paper and tape them together in a fashion so that they may be folded to form a congruent solid. (Students make own net patterns given various solids.)
SLE GS.1.2 Apply geometric properties and formulas (e.g., triangles have 180 degrees, opposite sides of rectangles are equal, Pythagorean theorem) to solve problems with and without appropriate technologies..	Students will apply geometric properties and formulas (e.g., Pythagorean theorem, volume formulas for cylinders and prisms and pyramids, surface area formulas for cylinders and prisms and pyramids, etc.) to solve problems with and without appropriate technologies.	. Teacher made test . State-wide test . Demon-stration . Writing	. Small groups of students are provided a rectangular solid (box) per group. They calculate the surface area and/or volume of the box. They write on a card a set of identifying clues for the box using their calculations. The boxes and clue cards are collected. Each group is given a card (not the card they had made). They locate the box that matches the clues on the card. They record their process and rationale in their math journal.

Grade Level 8

GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.3 Make predictions based on transformations of geometric figures in problem-solving situations (e.g., compare 2 pictures and determine what changes were made, i.e. flip, slide, rotation).	Students will make predictions based on transformations of geometric figures in problem-solving situations (e.g., designing buildings, using a solid to make a net/paper pattern of the solid, etc.)	. Teacher made test . Log . State-wide test . Exhibit-ion	. Students predict and draw the appearance of a building if the front and back are flips of each other, the sides are flips of each other, and the roof is a slide of the floor.
SLE GS.1.4 Establish and apply geometric relationships through informal reasoning (e.g., estimate angle measures).	Students will establish and apply geometric relationships through informal reasoning (e.g., estimate volume and surface area).	. Teacher observation . State-wide test . Teacher made test . Demon-stration	. Extend GS.1.1 to have the students construct a rectangular prism with the same base and height as the pyramid formed by the net. The students use the pyramid as a measuring unit. The pyramid is filled with rice. They count the number of times they must pour a filled pyramid into the constructed rectangular prism to make it full. This allows the volume of the rectangular prism to be determined and the volume of the pyramid to be derived. A formula for the volume of the pyramid is written and explained.

Grade Level 8

GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.5 Visualize, model, and represent 3 dimensional objects (e.g., cube models, base plans/nets, building plans, isometric dot paper sketches) to develop and implement problem-solving strategies and verify solutions.	Students will visualize, model and represent 3 dimensional objects (e.g., using nets/paper patterns to determine the surface area and volume of 3 dimensional objects) to develop and implement problem-solving strategies and verify solutions.	. Teacher made test . State-wide test . Exhibit-ion . Project	. Students form a cone using clay. They investigate the number of different cross-sections of the cone. The results are recorded by describing and drawing how the cone was sliced to get each figure (cross-section). (Suggests students use dental floss to slice clay.)

Grade Level 8

GEOMETRY AND SPATIAL SENSE

Standard GS.2.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.2.1 Construct geometric models to solve problems (e.g., comparing bridge supports: cylindrical vs. rectangular).	Students will construct geometric models to solve problems (e.g., comparing bridge supports, cylindrical vs. rectangular).	. Teacher made test . State-wide test . Exhibit-ion . Demon-stration	. As an end of unit project, students determine through construction and research which is better for the design of an office building: cylinder, prism, or pyramid. Explanations should take into consideration construction, maintenance cost, and potential rental income. The buildings and explanations for choice are exhibited.
SLE GS.2.2 Investigate geometric properties and use them to describe and explain situations in society and nature (e.g., why doors are rectangular, why honeycombs are hexagonal, why trusses are triangular).	Students will investigate geometric properties and use them to describe and explain situations in society and nature (e.g., the slope of stairways, access ramps, roof designs, roads, and ant hills).	. Teacher made test . State-wide test . Writing . Project	. Students identify a place in the community that is not wheelchair accessible. They design the most economical wheelchair ramp to fit that area. (Keep in mind the ability of the wheelchair bound person to maneuver up the ramp.) . Read: <u>String, Straightedge, and Shadow: The Story of Geometry</u> by Julia E. Diggins

Grade Level 8

MEASUREMENT

Standard M.1.0	Benchmarks	Assessment	Strategies/Activities
SLE M.1.1 Use estimation to check the reasonableness of measurements obtained from use of various instruments (including angle measures).	Students will estimate before determining the scale of a drawing to check for reasonableness of measures obtained from using various measuring instruments.	. Teacher observation . State-wide test . Perform-ance . Teacher made test	. Extend GS.2.2 to have the students estimate before determining the scale needed for the drawing of the wheelchair ramp. . Read: Size: The Measure of Things by Eric Laithwaite.
SLE M.1.2 Estimate, calculate, and compare the one, two, and three dimensional features of objects in metric, customary and non-standard units of measure.	Students will estimate, calculate and compare the volume of three dimensional objects in metric and customary units of measure.	. Teacher observation . State-wide test . Demon-stration . Teacher made test	. Precede GS.1.4 to have the students estimate the volume of the pyramid in relationship to the volume of the rectangular prism. The students can also estimate, calculate, and compare the volumes in metric and customary units.

Grade Level 8

MEASUREMENT

Standard M.1.0	Benchmarks	Assessments	Strategies/Activities
SLE M.1.3 Convert from one measurement to another within the same system (customary or metric).	**Students will convert from one measurement to another within the same system (metric and customary).**	. State-wide tests . Performance . Teacher made test . Observation	. Extend GS.2.2 to have the students convert the measurements of the wheelchair ramp within the same system. For example: students may make measurements to the nearest inch due to the measuring tool available but lumber is bought by the foot, thus a conversion is needed.

Grade Level 8

MEASUREMENT

Standard M.2.0	Benchmarks	Assessments	Strategies/Activities
SLE M.2.1 Select appropriate units and tools (metric, customary and non-standard) to measure to the required degree of accuracy.	**Students will choose the appropriate measuring units and tools to measure to the required degree of accuracy.**	. State-wide test . Demon-stration . Project . Teacher-made test	. Extend GS.2.2 to allow the students to choose the appropriate measuring tool and unit to measure to the required degree of accuracy.

Grade Level 8

MEASUREMENT

Standard M.3.0	Benchmarks	Assessments	Strategies/Activities
SLE M.3.1 Develop and use procedures to solve measurement problems using one, two, and three dimensions.	**Students will develop and use strategies to determine the volume and capacity of three dimensional objects.**	. **Teacher made test** . **State-wide test** . **Writing** . **Demon-stration**	. **See GS.1.2**

Grade Level 8

MEASUREMENT

Standard M.3.0	Benchmarks	Assessments	Strategies/Activities
SLE M.3.2 Using manipulatives and technology, develop the concepts of rate of change (mph, interest, tax rates, commissions, utility rates) and indirect measurements (heights of an object, width of a river).	Students will use manipulatives and technology to develop the concepts of rate of change (e.g., equivalent rates, utility rates) and indirect measurements that can be determined by similar figures, scale drawings, and the Pythagorean theorem.	. Teacher observation . State-wide test . Performance . Teacher made test	. Given graph paper, students cut three squares having the side length of each specified side of a right triangle. The students investigate the relationship of the size of the squares that were made from the side of the triangle to the size of the square made from the size of the hypotenuse of the right triangle. They develop the Pythagorean theorem in this activity. (Example: A right triangle of sides 3, 4, and 5 is given the students. The students cut a square measuring 3 units in length, and a square measuring 4 units in length, and a square measuring 5 units in length. Through their investigations they discover that both of the squares measuring 3 and 4 units in length equal the square measuring 5 units in length.) (Students may have to cut one of the smaller squares in order to get both smaller squares to fit on the larger square.)

Grade Level 8

MEASUREMENT

Standard M.3.0	Benchmarks	Assessments	Strategies/Activities
SLE M.3.3 Construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations.	**Students will construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations (e.g., highway layout).**	. Teacher made test . State-wide test . Project . Exhibit-ion	. See GS.2.1 and GS.2.2

Grade Level 8

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.1.0	Benchmarks	Assessments	Strategies/Activities
SLE DSP.1.1 Actively and systematically collect, organize and describe data using technology when appropriate.	Students will actively and systematically collect, organize and describe data using technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheet) when appropriate.	. Teacher made test . Performance . Statewide test . Writing	. See NPO.2.4
SLE DSP.1.2 Construct, read and interpret tables, charts and graphs (including stem-and-leaf, histogram, bar graph, pie graph, box and whiskers, line graph, scatter plots) with and without technology.	Students will construct, read and interpret tables, charts, double bar graphs, double line graphs, circle graphs, histograms, scatter plots and stem-and-leaf plots with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, etc.) and appropriate computer software (e.g., spreadsheets).	. Statewide test . Project . Writing . Demonstration	. See NPO.2.4

Grade Level 8

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.1.0	Benchmarks	Assessments	Strategies/Activities
SLE DSP.1.3 Based on analysis of central tendencies (mean, median, mode, range) make predictions and inferences (e.g., interpolate from within graphs and extrapolate by extending graphs) from the data set with and without technology.	**Based on analysis of central tendencies (mean, median, mode) and range, students will make predictions and inferences (e.g., interpolate from within graphs and extrapolate by extending graphs) from the data set with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).**	**. Teacher made test . State-wide test . Demon-stration . Writing**	**. Students keep a record of the daily high temperature for a period of a week. Based on the analysis of central tendencies students predict the high temperature for the following week. The data and prediction is compared with the information in an almanac. The process, rationale for prediction, and results of comparison are recorded in their math journals.**

Grade Level 8

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.2.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.2.1 Conduct experiments or simulations, with and without technology, to model situations and construct *sample spaces.*	**Students will conduct experiments or simulations, with and without technology, to model situations and construct *sample spaces* (e.g., use a counting tree to determine all possible outcomes of a game or experiment).**	. Log/ journal . Perform-ance . Project	. Students are given a lunch menu showing the lunch special at a local diner. The special consists of "your choice of one meat and two vegetables" for $3.99. There are two meats and four vegetables from which to choose. The students generate and record all possible combinations for the lunch special. . Read: Socrates and the Three Pigs by Tuyosi Mori.
SLE DSP.2.2 Make predictions based on experimental and theoretical probabilities.	**Students will tell the likelihood of an event based on experimental and theoretical probabilities (e.g., determining the chances to win a prize in a sweepstakes).**	. Teacher observation . State-wide test . Writing . Teacher made test	. Students are provided with game cards that have five covered spaces on each. Only two spaces may be scratched If the spaces match, they win. The students determine the likelihood of winning. Their rationale is recorded in their math journal.

Grade Level 8

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.2.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.2.3 Use a probability model for comparing experimental results with theoretical expectations.	Students will use a probability model (an activity that simulates the use of probability) for comparing experimental results with theoretical expectations (e.g., theoretical probability of drawing a winning number from a bowl of 20 different numbers is 1/20, but the experimental results may vary).	. State-wide test . Exhibit-ion . Observ-ation . Writing	. Extend DSP.2.2 to have the students compare their cards to see how many scratched two matching squares.
SLE DSP.2.4 Interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.	Students will interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.	. State-wide test . Writing . Teacher made test	. Extend DSP.2.2 to have the students interpret the probabilities to determine whether the game is fair.

Grade Level 8

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.3.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.3.1 Evaluate arguments that are based on statistical data.	Students will evaluate arguments that are based on statistical data (e.g., effects of proposed legislative actions).	. State-wide tests . Writing . Teacher made test . Perform-ance	. See NPO.1.2, DSP.1.3, DSP.2.2, DSP.2.3, and DSP.2.4
SLE DSP.3.2 Make inferences and convincing arguments based on statistics with and without technology.	Students will make inferences and convincing arguments based on statistics (e.g., effects of new or revised laws) with and without technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).	. Teacher observation . State-wide test . Teacher made test . Demon-stration	. DSP.3.1

Grade Level 8

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.3.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.3.3 Model the use of probability and statistical methods in decision making using technology presentation materials (e.g., LCD, graphing calculators, spreadsheets, etc.).	**Students will model the use of probability and statistical methods in decision making using technology presentation materials (e.g., LCD, graphing calculators, spreadsheets, etc).**	. State-wide test . Exhibit-ion . Project . Demon-stration	. See DSP.3.1

Grade Level 8

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.1.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.1.1 Represent arithmetic as algebra (change 25 = __ + 13 to 25 = m + 13).	Students will represent the whole-number properties (e.g.,distributive, multiplicative inverse, etc.) in algebraic form.	. Writing . State-wide test . Project . Perform-ance	. Students algebraically represent and model the whole-number properties using algebra tiles.
SLE PAF.1.2 Through the use of manipulatives and computer technology, develop the concepts of variables, expressions, and equations (algebra tiles, two color counters, graphing calculators, balance scale model, etc.).	Students will use manipulatives and computer technology (e.g., algebra tiles, two color counters, graphing calculators, balance scale model, etc.) to develop the concepts of equations.	. Teacher made test . State-wide test . Exhibit-ion . Writing	. Students use an algebra balance to develop the concepts of equations. For example, x+2=4 is represented on the balance. If 2 is removed from one side of the balance, it must be removed from the other side in order to keep the balance from tipping.

Grade Level 8

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.1.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.1.3 Analyze and represent (through calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear, exponential, and quadratic patterns).	Students will analyze and represent (with and without calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear, exponential, and quadratic patterns).	. Teacher observation . State-wide test . Demon-stration . Exhibit-ion	. See NPO.1.1, NPO.1.6, and NPO.2.4
SLE PAF.1.4 Summarize and pose problems/situations relating to the algebraic relationships, patterns, and functions, discovered through explorations.	Students will summarize and pose problems/situations relating to algebraic relationships (e.g., linear equations), patterns (e.g., exponential and quadratic), and functions discovered through explorations.	. Teacher made test . State-wide test . Writing . Portfolio	. Students analyze number tricks by representing them algebraically. They create their own number tricks. The created number trick, the algebraic representation of the number trick, and the verification of the success of the number trick is recorded in their math journals. If any corrections need to be made to the trick, then the method of discovering the mistake, the mistake, and the steps to correcting the mistake are also recorded.

Grade Level 8

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.2.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.2.1 Conduct informal investigations (with technology) for analyzing, representing, interpreting, and generalizing functional relationships (e.g., distance and time) to develop explanations or predictions about outcomes of actual situations.	**Students will conduct informal investigations (with appropriate technology) for analyzing, representing, interpreting, and generalizing functional relationships (e.g., distance and time) to develop explanations or predictions about outcomes of actual situations.**	. State-wide test . Perfor-mance . Writing . Project	. See NPO.2.4
SLE PAF.2.2 Identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from graphs, tables, words, and expressions).	**Students will identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from graphs, tables, words, and expressions).**	. Appro-priate response to teacher direct questions . Verbal explanation . Teacher observation . Peer and self evaluation . Improved vocabulary . State-wide test . Perform-ance . Checklist	. Students are given a situation. They use a table to model the situation. They translate the situation into words. (For example, students are given the population of a country for the years 1950 and 1990. They create an addition and multiplication model of population growth based on the given numbers. They decide which model fits the data better by using graphical and numerical tests. They make a population forecast for the country in the year 2040. The students record their process, rationale, and forecast in their logs.

Grade Level 8

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.2.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.2.3 Write and solve equations and inequalities (using manipulatives and technology).	Students will write and solve equations (linear, quadratic, and exponential) and inequalities (using manipulatives and appropriate technology).	. Teacher observation . State-wide test . Teacher made test . Perform-ance	. Students are given the area of a polygon and a description of the sides. They use the given information to find the missing dimensions of the polygon. For example: the length is 2 more than the width. If the area is 42, what are the dimensions of the rectangle? The students are to record the process they use to solve the problem in their math journals.
SLE PAF.2.4 Communicate in written and verbal form a verification of the solution and the process used to obtain the solution.	Students will communicate in written (e.g., journals, open-ended assessments, etc.) and verbal forms the justification of the solution and the process used to obtain the solution (e.g., "How do you know your solution is the best choice?"); use a scoring guide to perform self-evaluations.	. State-wide test . Demon-stration . Writing . Portfolio	. See PAF.1.4, PAF.2.2, PAF.2.3, and PAF.2.5 . Extend PAF.1.1 and PAF.1.2 to have the students record the process used to do the activity.

Grade Level 8

PATTERNS, ALGEBRA AND FUNCTIONS

Standard PAF.2.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.2.5 Use a calculator to display, to determine, and to make inferences from linear relationships in slope-intercept form.	Students will use a calculator to display, to determine, and to make inferences from linear relationships in slope-intercept form (e.g., In the graph of the equation y = $24.50 x + $10.00, what does the y-intercept represent?).	. Teacher observation . State-wide tests . Demon-stration . Teacher made test	. Students apply knowledge of slope and y-intercept to real-world situations. For example: Video store A has a one time joining fee of $25.00 and each movie rents at $2.50 per night. Video B has no joining fee and rents it's movies at $3.00 per night. The students write linear equations in slope-intercept form to represent each situation. They graph each equation on the graphing calculator. They make inferences from the relationships of the slopes and intercepts to determine at which point each video store has the best offer. They extend the activity by planning to open their own video store. They determine, represent algebraically and graphically their rental policy in order to be competitive with video stores A and B. The students record their process and rationales in their math journal.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

☑ This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

☐ This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").